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ABSTRACT

Dissemination of technologies to increase agricultural production using the conventional transfer of technology system has often failed to consider the natural environment, indigenous knowledge systems, and resource endowments around which resource-poor farmers normally operate. A sample of 96 agricultural extension professionals in 2 districts in India was surveyed to identify perceptions of agricultural extension professionals in India regarding indigenous knowledge systems. Extension personnel were grouped into two categories for analytical purposes. Assistant Directors of Agriculture and Agricultural Officers were grouped as "extension administrators"; village extension workers were termed "field-level extension workers." Respondents considered highly important the statement "extension worker's knowledge of local traditions should be given consideration." They rated low the statement "the technology transfer model is appropriate for locally diversified farmers' food production systems." With respect to statements regarding incorporating indigenous knowledge systems into agricultural and extension education, six statements received mean ratings of four and above. Extension personnel perceived three factors as essential for revitalizing the agricultural system: exploiting extension workers' knowledge of local traditions; training extension personnel on methodologies for recording indigenous knowledge systems; and strengthening the feedback mechanism from farmers to extension and then to researchers. A model to integrate indigenous knowledge systems into agricultural and extension education was developed based on study findings. Its four units were training, recording indigenous knowledge, feedback, and integration. (Contains 15 references.) (YLB)

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INCORPORATING INDIGENOUS KNOWLEDGE SYSTEMS INTO AGRICULTURAL AND EXTENSION EDUCATION PROGRAMS: A STUDY OF THE PERCEPTIONS OF EXTENSION PROFESSIONALS

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INTRODUCTION

Dissemination of technologies to increase agricultural production using the conventional transfer of technology (TOT) system has often failed to consider the natural environment (e.g., local watersheds), indigenous knowledge systems (e.g., indigenous soil classification), and resource endowments (e.g., labor availability) around which resource-poor farmers normally operate (Warren et al. 1988; Chambers, 1989; Martin and Rajasekaran, 1990; Gupta, 1991). Continuing intensive agricultural production strategies, while neglecting these grass-roots factors, may worsen the physical, natural, and human environment of resource-poor farmers of the developing world.

An indigenous knowledge system is knowledge based on an awareness, familiarity, conceptualization, and beliefs acquired by local people through accumulation of experiences, non-formal experiments, and intimate understanding of the environment of a given culture, at a specific geographical location and during a specified period of time (Rajasekaran, 1991). Indigenous knowledge systems are learned ways of looking at the world (McClure, 1989). Farmers' knowledge regarding many aspects of agriculture is often broad, detailed, and comprehensive, although this is not always the perception among agricultural scientists and extensionists (Thruston, 1992).

Attitudes generated by the TOT paradigm have precluded learning indigenous knowledge from resource-poor farmers. Reasons for non-adoption of innovations resulting from the conventional TOT paradigm have been attributed to characteristics of the small-scale farmers or an inadequate delivery system but seldom to the characteristics of the innovations themselves (Waters-Bayer, 1989). Technologies recommended through agricultural extension programs are often based on research conducted at regional research stations and usually overlook indigenous agricultural knowledge (Rajasekaran and Martin, 1990). Higher-level extension administrators are less interested in learning from village extension workers (VEWs) about the farmers' cultural practices, preferring to hear about the successful adoption of technologies developed from the research stations. There is a tendency to view the VEWs as mere messengers, ignoring the fact most of them were raised in villages and spent their childhoods on small-scale farms, absorbing the indigenous agricultural knowledge for a given solution (Warren, 1991). VEWs represent an interface between farmers' knowledge and formal agricultural knowledge (Waters-Bayer and Farrington, 1990).

Farmers are mainly seen as the recipients of extension recommendations but not the originators of either technical knowledge or improved practice (Moris, 1991). Farmers' informal experimentation has long been under-perceived (Rhoades and Bebbington, 1988). Farmers' priorities have not traditionally been considered while conducting on-farm research trials (Rajasekaran and Martin, 1990). Farmers are familiar with testing alternative coping mechanisms to avert extreme conditions such as droughts and floods, and researching diversified food production techniques.

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Incorporating indigenous knowledge systems into agricultural and extension education programs is essential for: (1) understanding the 'emic' perspectives of local people; (2) bridging the communication gap between outsiders and insiders; (3) recognizing the accomplishments of local farmers; (4) making outsiders familiar with local conditions and abstract terms; and (5) increasing the participation of farmers and their organizations in integrating, utilizing and disseminating what already exists (Rajasekaran, 1991). Understanding local agricultural knowledge would strengthen the extension process, particularly by drawing upon the experience of expert farmers and other persons regarded by the community as being particularly knowledgeable about the environment (Compton, 1989). Hence, understanding farmers' knowledge allows a framework of reference for increasing the effectiveness of agricultural and extension education programs (Scoones, 1989).

It is evident from the aforementioned theoretical framework that agricultural and extension education program effectiveness would be improved if extension professionals had a greater awareness of indigenous knowledge systems. Thus, it is essential that efforts be taken to utilize indigenous knowledge systems while developing agricultural and extension education programs. However, without understanding the perceptions of extension professionals who play a crucial role in implementing these programs, it is difficult to proceed further in this direction. Hence, it was decided to conduct a survey among the agricultural extension professionals regarding their perceptions of indigenous knowledge systems in India.

PURPOSE AND OBJECTIVES

The overall purpose of this study was to identify the perceptions held by agricultural extension professionals in India regarding indigenous knowledge systems and to develop an appropriate model for using indigenous knowledge.

The specific objectives of the study were:

1. To identify the importance of selected indigenous knowledge concepts as perceived by agricultural extension professionals;
2. To identify the use of indigenous knowledge in agricultural extension programs as perceived by agricultural extension professionals;
3. To compare perceptions regarding indigenous knowledge systems according to various levels of extension professionals; and
4. To develop a model for incorporating indigenous knowledge systems into agricultural and extension education programs in India.

METHODS AND PROCEDURES

The study was conducted by researchers at Iowa State University. The research design used for this study was a descriptive survey method as well as a participant observation method. The target population for this study was 962 agricultural extension professionals of the state of Tamilnadu, India. Cluster sampling procedure, were used to draw the sample. There are twenty-four districts in Tamilnadu state and two districts were randomly selected (ten percent of the population). The sample size was 96 agricultural extension professionals. All the extension professionals belonging to the two districts (clusters) were included as the sample for the survey (Thiruvannamalai District=44; Madurai District=52).

A survey questionnaire was developed for the study by the researchers and it was reviewed for content validity by a panel of experts in agricultural and extension education. Cronbach's alpha reliability coefficient values for the instrument were 0.9635 and 0.9042 for the two scaled portions of the instrument. The questionnaire, containing twenty-six statements related to indigenous knowledge systems was used to collect the data from the respondents. A Likert-type scale with points ranging from 1 (Low) to 5 (High) was used to collect information regarding extension professionals' perceptions of selected indigenous knowledge concepts. Zonal workshops in both

the districts were attended by the researcher to collect the data directly from the respondents. The zonal workshops are the meeting points where the extension personnel receive technological recommendations from the agricultural research scientists. The extension personnel represent three different hierarchies: Assistant Directors of Agriculture (divisional level), Agricultural Officers (block level), and Village Extension Workers (village level). Requests were made earlier to attend the workshops for data collection. The last half-hour of the workshops was allocated to complete the questionnaire. The researcher attended all of the sessions of the one-day workshops. The information obtained from the workshops was used to interpret some of the data.

Mean scores and standard deviations were computed for all the indigenous knowledge statements to determine the level of agreement regarding selected indigenous knowledge statements as perceived by agricultural extension personnel and also to determine perceptions held by agricultural extension personnel regarding using indigenous knowledge in agricultural extension programs. A t-test was conducted to identify the differences among the various hierarchies of the agricultural extension system as well as the differences between the two districts at .05 alpha level.of significance.

RESULTS

The extension personnel were grouped into two categories for analytical purposes. The Assistant Directors of Agriculture and Agricultural Officers were grouped as "extension administrators." The Village Extension Workers were termed as "field-level extension workers." Table 1 shows the mean ratings and standard deviations regarding the extent to which selected indigenous knowledge statements were important to extension personnel in India. Out of 8 statements, 5 statements were important to extension personnel. The statement, "extension worker's knowledge of local traditions should be given consideration" was considered highly important with a mean rating of 4.46. The statement, "The technology transfer model is appropriate for locally diversified farmers' food production systems" was rated low by the extension personnel. The mean rating was 2.87. With respect to statements regarding incorporating indigenous knowledge systems into agricultural and extension education, 6 statements received mean ratings of 4 and above (Table 2). The statement, "extension workers must learn how to identify and evaluate indigenous knowledge systems" was rated by extension personnel with a mean rating of 4.38. The statement, "extension workers must support farmer-to-farmer information exchanges" received a more neutral rating with a mean of 3.86.

The perceptions of extension administrators differed statistically using a t-test from the field-level extension workers regarding the statement, "incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs" (Table 3). Zonal workshops and bi-weekly training programs are two pipelines of the research-extension delivery system. The extension administrators might not want to disturb the existing system. In other words, making changes in the system is a policy decision. The extension personnel belonging to two different hierarchies did not differ statistically regarding other statements pertaining to incorporating indigenous knowledge systems into agricultural and extension education programs.

It was somewhat surprising to find that the extension personnel, irrespective of their hierarchies, were found to be somewhat aware of the value of indigenous knowledge systems. The limitations of the existing technology transfer paradigm were also recognized by the extension personnel. With respect to incorporating indigenous knowledge systems into agricultural and extension education programs, the extension personnel perceived that three factors were essential for revitalizing the existing agricultural extension system: (1) Exploiting extension workers' knowledge of local traditions; (2) Training the extension administrators and field-level workers on the methodologies for recording indigenous knowledge systems; and (3) Strengthening the feedback mechanism from farmers to extension and then to researchers.

Table 1. Means and standard deviations regarding the extent to which selected indigenous knowledge statements were rated as being important to extension personnel in India (n=96)

Indigenous Knowledge Statements	Mean	S.D.
Extension worker's knowledge of local traditions should be given consideration	4.46	0.64
Scientists continue to ignore farmers' risk aversion strategies	4.29	0.76
Diversified food production is one of the strategies of small-scale farmers	4.11	1.17
Farmers' varying production goals should be considered before designing on-farm research trials	4.06	1.19
The feedback from extension to research is usually the weakest part of the information systems	4.03	1.19
Indigenous knowledge of women in agricultural production is not given due regard by society in general	3.89	1.25
Technological interventions normally overlook the critical linkages among soils, climate, livestock, trees, and crops	3.23	1.42
The traditional Technology transfer model is appropriate for locally diversified farmers' food production systems	2.81	1.79

1=Not important; 2=Low importance
3=Neutral; 4= Highly important; 5=Very highly important

Table 2. Means and standard deviations regarding incorporating indigenous knowledge systems into agricultural and extension education programs (n=96)

Statements Regarding Incorporating Indigenous Knowledge Systems into Extension Programs	Mean	S.D.
Extension workers must learn how to identify and evaluate indigenous knowledge systems	4.38	0.87
Training programs must be conducted to explain the methodologies for recording indigenous knowledge	4.33	1.12
Effective and systematic approach to elucidate feedback information on farmers' problems, constraints regarding technologies	4.21	1.84
Incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs	4.17	1.90
Farmers' forums must be conducted by extension workers to elucidate indigenous knowledge	4.11	1.22
Identifying informal local-level farmer organizations	4.06	1.33
Extension workers must support farmer-to-farmer information exchange	3.86	1.41

1=Not important; 2=Low importance
3=Neutral; 4= Highly important; 5=Very highly important

Table 3. T-values analyzing the differences in perceptions between various hierarchies of extension professionals regarding incorporating indigenous knowledge systems into agricultural extension programs

Statements Regarding Incorporating Indigenous Knowledge Systems into Extension Programs	Extension administrators	Field-level workers	T-value	Probability
Extension workers must learn how to identify and evaluate indigenous knowledge systems	4.21	4.47	.74	.462
Training programs must be conducted to explain the methodologies for recording indigenous knowledge	4.42	4.15	.78	.440
Effective and systematic approach to elucidate feedback information on farmers' problems, constraints regarding technologies	4.06	4.22	.22	.830
Incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs	3.86	4.34	2.82*	.047
Farmers' forums must be conducted by extension workers to elucidate indigenous knowledge	4.21	3.90	.82	.427
Identifying informal local-level farmer organizations	4.12	3.97	.96	.365
Extension workers must support farmer-to-farmer information exchanges	3.76	3.92	.71	.449

*Significant at 0.05 level

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations were made based on the findings of the study:

There is much to be learned from farmers. Agricultural extensionists must be provided opportunities to learn the methodologies for systematically recording the indigenous agricultural knowledge available in every community. We can build upon these new sensitivities to understand farmers' perspectives of risk, how they define their problems and needs as well as their goals and objectives, and how these can provide the basis for an interactive extension program rather than one focused on top-down dissemination of information.

A model to integrate indigenous knowledge systems into agricultural and extension education has been developed based on the findings of the study. Training, recording indigenous knowledge recording, feedback, and integration are the four units of the proposed model. Establishing a national resource center for dissemination and training of indigenous knowledge provides the starting point for the model. The concept of establishing a national resource center was developed by Professor Michael Warren, Director of Center for Indigenous Knowledge for Agricultural and Rural Development (CIKARD). He has pioneered the establishment of 9 national

indigenous knowledge centers so far in Nigeria, Mexico, Philippines, Indonesia, Australia, Kenya, Benin, Nepal, and Costa Rica. The role of the national resource center is to act as a clearinghouse for collecting, documenting, and disseminating information on indigenous knowledge on agricultural and rural development. Once extension administrators are trained on the methodologies for recording indigenous knowledge, they can develop training programs for field-level extension workers considering the local cropping conditions and socio-cultural environments. A training manual is essential for introducing the methodologies for identifying and recording indigenous knowledge systems into agricultural extension educational settings. Separate sessions could be allocated during the zonal workshops and bi-weekly training programs to educate the methodologies for recording indigenous knowledge systems.

Participant observations, unstructured interactions, participatory meetings, and indigenous taxonomies are some of the examples of the methodologies for recording indigenous knowledge systems. The details of these methodologies are described in Warren and Rajasekaran (1991). Using these methodologies, the field-level extension workers are expected to identify and record indigenous knowledge systems pertaining to agricultural production in their respective areas. The indigenous knowledge systems thus collected should be fed back to the extension-research system via bi-weekly training programs and zonal workshops.

Integrating indigenous knowledge systems and research station technologies form the final unit of the proposed model. After receiving the feedback information concerning indigenous knowledge systems, the research station scientists should systematically classify the data/information according to disciplines (for instance, crop varietal selection, soil health care practices, water management). On-station and on-farm research projects should be conducted by the respective discipline scientists based on the classified indigenous knowledge systems . For example, the plant breeders may use indigenous knowledge regarding crop varietal selection.

Sensitizing the agricultural and extension education community to learning from resource-poor people and their understanding of the natural resource environments should be one of the essential principles of agricultural and extension education programs in the years to come. Devaluing indigenous knowledge systems as "low productive," "primitive," and "old" is no longer a useful attitude. Dissemination of research station technologies is essential to increase agricultural production, but they should be carefully built on the foundation of indigenous knowledge of resource-poor people in order to successfully accomplish the mission of food security and the preservation of natural resources for future generations.

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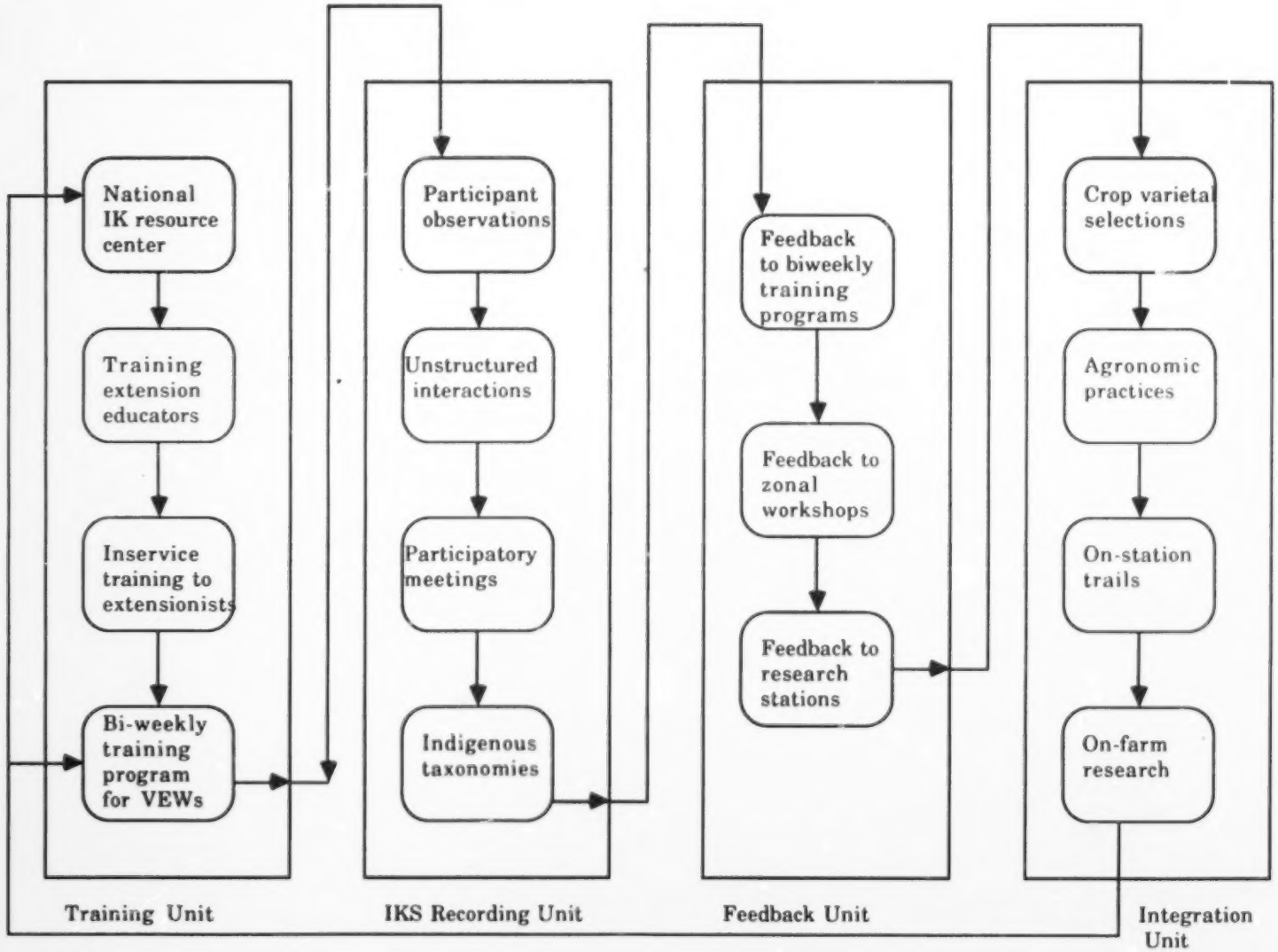

Figure 1. A Model for Incorporating Indigenous Knowledge Systems into Agricultural and Extension Education Programs